Abstract Submitted
for the DAMOP11 Meeting of
The American Physical Society

Dynamic Scaling Behavior of the Hysteresis Loop Area in a Periodically Modulated Cold Atomic System under Oscillating Bias Field YONGHEE KIM, MYOUNG-SUN HEO, GEOL MOON, JI-HYOUN KIM, WONHO JHE, Department of Physics and Astronomy, Seoul National University
— Measuring the system response to the oscillating bias field is fundamental tool to investigate the dynamic properties of nonequilibrium systems. We demonstrate the dynamic bi-stable states which show mean-field type phase transition using the parametrically modulated magneto-optically trapped Rb atoms. And we realize the bias field in this system by adding the weak additional modulation to the parametric modulation. We measure the system response to the oscillating bias field varying the amplitude and frequency of the bias field. The system shows hysteresis phenomena, and the area of the hysteresis loop shows the dynamic scaling behaviors. The experimental results show that the scaling exponents depend on the total number of atoms. And we observed that the period averaged order parameter shows nonequilibrium criticality called dynamic phase transition.

Yonghee Kim
Department of Physics and Astronomy, Seoul National University

Date submitted: 31 Jan 2011 Electronic form version 1.4